

# Role of Research and Development Innovation between Ownership Structure and Firm Performance

Muhammad Siddique<sup>1</sup>, Abdul Rasheed<sup>2</sup>, Khalil Ur Rehman<sup>3</sup>

<sup>1</sup>PhD Scholar, Khwaja Fareed University of Engineering & Information Technology, Pakistan.

<sup>2</sup>Assistant Professor, Institute of Business Administration, Khwaja Fareed University of Engineering & Information Technology, Pakistan

<sup>3</sup>Assistant Professor, Institute of Business Administration, Khwaja Fareed University of Engineering & Information Technology, Pakistan

Correspondence: [siddiqilaghari@gmail.com](mailto:siddiqilaghari@gmail.com)<sup>1</sup>

## ABSTRACT

This study investigates the moderating role of research and development intensity (R&D) between ownership structure (OS) and financial firm performance (FP). The Estimated Generalized Least Squares (EGLS) model was used on a panel data sample of 296 non-financial firms listed at the Pakistan Stock Exchange (PSX) during 2011-2020. Research findings help to understand the R&D innovation policy implementation support to enhance the firm's financial performance. The results indicate that R&D innovation interaction with OS (concentrated, institutional, managerial, and family ownership) has a positive and statistically significant association with FP and varies according to performance measures. The study findings contain functional implications for practising corporate governance (CG) in emerging economies. Non-financial firms in emerging countries can enhance their financial performance by investing in R&D innovation projects.

**Keywords:** Ownership structure, Research and development, Firm performance.

## Introduction

The profitability of the firm has been extensively studied for research and development intensity (R&D) in emerging and developed countries (Cordeiro *et al.*, 2018; Mughal *et al.*, 2020; Pava & Krausz, 1996; Lin, Yang & Liou, 2009; Mishra & Suar, 2010; Asogwa *et al.*, 2020; Padgett and Galan, 2010). However, there is limited evidence about the role of R&D in enhancing the performance of different ownership structures. While R&D significantly impacts competitiveness and national development and can lead to improved company performance and expansion (Diéguez-Soto *et al.*, 2019a). CG studies showed that R&D influence the firm's ownership and performance. R&D role for performance varies according to ownership type. As Lodh, Nandy and Chen (2014) stated that one stream is that family owners are risk averse and restricted from investing in R&D projects which ensure regular income and protection of their wealth. The second stream is that family and managerial ownership invest in R&D projects by sacrificing their interest to make the firms healthy and durable and enhance the shareholder's wealth. While the institutional and concentrated ownership depends on the institutional environment. Evidence

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suggests that in developing markets, family ownership has a positive statistical relation with R&D (Lodh et al., 2014) which is linked with the second stream view.

Studies are performed to investigate the moderating role of R&D between ownership and FP; Like, Zhang, Chen and Feng (2014) conducted an investigation in Chinese I.T. listed firms, using data for 2007-2008 to explore the moderating role of R&D investment between concentrated, managerial ownership and FP. They found the absence of R&D moderating effects with CG on FP. J Diéguez-Soto et al. (2019) also investigates the R&D moderating effect on family-managed firms and found that R&D intensity strengthens the negative relationship between family ownership and FP. They also found that a higher value of R&D is the significant moderating factor of ownership and performance.

Extant literature results are inconsistent, inconclusive conclusive, and are limited. Therefore, to bridge the gap, this study considers it necessary to investigate how R&D interaction with OS enhances FP. The firm's OS in Pakistan is unique to those of developed countries in term of cultural difference, social and political environment (Hussain & Safdar, 2018), as the CG system is weak in protecting minority shareholders (Bano et al., 2018; Hussain & Safdar, 2018) which leads to family and concentrated ownership dominating strategic decisions of the firm. Where, distinction between control and ownership is not exist (Hussain & Safdar, 2018). Therefore, identity of ownership is more matter, and specific factor as R&D intensity influencing the ownership-performance relationship is crucial. The study's main goal is to (1) investigate how different ownerships affect performance and (2) investigate how R&D intensity moderates the ownership-performance relationship.

This study adopts a panel data technique for research analysis using the emerging market data of non-financial firms listed on the Pakistan Stock Exchange (PSX) from 2011-2020. This paper contributes to the CG body by exploring insight into R&D innovation moderating effects between different OS and FP. It is helpful for policymakers to consider the impact of R&D on fostering business activities and promoting R&D innovation in Pakistan. Pakistan is poorer in doing business and ranked 108 reported by World Bank in 2020 (W. Bank, 2020). According to World Intellectual Property Organization (WIPO) (2022), Pakistan's rating in 2019 for both R&D innovation and overall innovation was 105.

## **Literature Review**

Several theoretical and empirical studies have been conducted to investigate the impact of OS and R&D innovation on organisational performance.

### ***Family Ownership and Firm Performance***

Family members are substantial shareholders in the company, as measured by the proportion of shares they possess (Yu et al., 2015). In family ownership, family members show their involvement in business activities. The family members emotionally engage with the business. The socio-emotional wealth of a family business derives from the collective striving of its members for wealth. Emotional engagement converts to emotional investment because the family name is used for products and services. Family members are more conscious of any tarnish from employees, society, customers, and the government (Yu et al., 2015). US-based Investigation analysed with review technique found in high-quality liberal market family ownership firm outer performed non-family firm (Van Essen et al., 2015).

Second, as long as the long-term association of family members, the firm strives for long-term investment decisions in business. Owing to the association's longevity, they participate in employees' social, legal, and welfare and incentives to their creditors and investors. Research carried out in Pakistan, where took 60-non financial firms' data from 2003-2008 to determine the effect of different OS on FP, found that family ownership is positively associated with FP (Bano et al., 2018). He argues that family firms demonstrate firm control and mitigate agency problems. So, based on the literature review, this study emphasized that:

Ha<sub>1</sub>: Family ownership has a positive relationship with firm performance.

### ***Concentrated Ownership and Firm Performance***

Concentrated ownership refers to a significant portion of the firm's share in a few hands. The prior literature indicates that the top five shareholders of the firm use it as a proxy for concentrated ownership. Empirical studies found that in Pakistan, ownership of the firm has concentrated (Bano et al., 2018). Concentrated ownership has its own cost, and the dominated board plays an active role in the strategic decision and always tries to deprive the minority shareholders. Secondly, concentrated ownership capital cost is higher as compared to dispersed ownership. Thirdly, it decreased the opportunities for external investors. Significant shareholding diffuses the control over the management (Bano et al., 2018). The impact of ownership concentration on FP varies depending on who is a key shareholder. Potential large owners include family members, foreign entities, financial institutions, and individuals. Bano et al. (2018) empirically discovered that most firms are under ownership concentration in Pakistan. They performed panel data analysis on 60 non-financial firms listed in Pakistan, and found that ownership concentration in family and foreign ownership has a significant positive impact on FP measured by ROA, ROE and Tobin's Q. The families minimize the agency problems and play an active role in strategic decisions.

Further, they found that financial institutions and individuals did not impact FP if ownership concentration is identic. Another empirical study on 175 Greeks listed the firm's data; concentrated ownership positively correlates with FP measured as Tobin's Q (Nielsen & Huse, 2010). The empirical finding revealed that concentrated ownership positively correlates with performance in a weak legal environment (Bano et al., 2018).

Ha<sub>2</sub>: Concentrated ownership has a positive relationship with firm performance.

### ***Institutional Ownership and Firm Performance***

Institutional ownership refers to the controlling share infirm by institutions. Many researchers posited that institutional investors strongly influence firm strategic decisions (Soetedjo & Amu, 2019). They contend that institutional investors have significant voting power and an asymmetric knowledge advantage over ordinary investors. Both things made them more attentive to the firm's decision than non-institutional owners. Financial institutions furnished finance to the firm in this conjecture. Joint ownership of debts and equity by large intuitions in firms asserts their influence on management. It strengthens management controlling and cognitive decisions to raise the market value and FP (Bano et al., 2018).

Moreover, the institutional owner manages and contains the key performance drivers: internal capability of the firm, FP, innovation activities, and other activities in line with sustainable development (T. Chen et al., 2020). The FP varies with change in ownership type (Bano et al., 2018). Empirically found in India, institutional ownership positively correlates with the firm's value measures with Tobin's Q (Singh et al., 2018). Contrary to this, in Pakistan, institutional ownership is negatively related to FP and argued that institutes deploy their manager as nominee directors. Still, they do not perform actions to enhance their performance (Bano et al., 2018). Second, institutional investors are not uniform like banks, insurance firms, mutual funds, and modaraba businesses. Their obligations for monitoring are affected by the type of institution, the length of their investment period, and their investing inclinations. Third, because institutional investors' monitoring capability is limited, it is optimal for them to supervise all of the enterprises in their portfolios equally (Ward et al., 2020). Lower FP in institutes-owned firms argues that institutional owners do not represent all firms' shareholders. Therefore, its impact on firm profitability is not significant. With these arguments, a study conducted in Hong Kong with the data of 433 publicly listed firms found that institutional ownership negatively affects FP (Li et al., 2006). Based on prior literature, it hypothesized that:

Ha<sub>3</sub>: Institutional ownership has a negative relationship with firm performance.

### ***Managerial ownership and Firm Performance***

Managerial ownership is to whether management buys firm stock for cash or in exchange for perks. The manager-owned stock has voting rights. Agency theory implies that stock ownership to managers aligns with the interest of principals and management. Managers who own substantial stock strive for effective decisions to maximize the shareholder's wealth (Soetedjo & Amu, 2019). Empirical results of Greek-listed firms posited that managerial request positively relates to FP (Nielsen & Huse, 2010). Empirical findings from Budapest Stock Exchange-listed firms indicate that managerial ownership is effectively only in dispersed firm ownership (Earle, Kucsera and Telegdy, 2005). Bano et al. (2018) find that in Pakistan, managers with strong incentives to manage the matters of firms effectively and generate wealth for their fortunes are tied to enhancing the firm's performance and market value. In managerial ownership, rights of the firm's properties are vested with owners, which encourage them to invest in profitable projects and greater participation in decisions and monitoring of the firms.

Furthermore, owing to rights on assets of the firm focused on growth. Bano et al. (2018) explored by using 60 non-financial firms' data of Pakistani firms that managerial ownership positively correlates with firm value. They have strong incentives to control the firm wealth and their benefits tied to the performance firm. Based the literature review and empirical studies, we emphasized that:

Ha<sub>4</sub>: Managerial ownership has a positive relationship with firm performance.

### ***Resource Based-View Theory and Firm Performance***

The firms with valuable and rare resources reap competitive advantage and superior returns—the complex resources to imitable guarantee outstanding FP (Padgett & Galan, 2016). Grant (1991), Branco and Rodrigues (2006); Nair & Bhattacharyya (2019); Padgett & Galan (2016) recognized that R&D give rise to intangible resources and the means to avail super FP and competitive advantage.

### ***Moderating Effects of R&D Innovation on Ownership Structure and Firm Performance***

Several studies examined the R&D innovation effect on FP (Chatterjee & Bhattacharjee, 2020). Fu, Boehe & Orlitzky (2020) posited that R&D integrates the knowledge of multiple employees to produce innovative products and services. R&D strategy directs how management deploys resources to achieve business objectives and gain a competitive edge (Boiko, 2021). R&D activities generate specialized knowledge about firm stakeholders, their demands and customer behaviours for new products and synergies in R&D enhance the firm's performance. Both types of innovation involve risk factors like the risk of failure in a new process, and new technology can be unclear (Lodh, Nandy and Chen, 2014; Chatterjee & Bhattacharjee, 2020). Therefore, all market participants are not fully aware of the innovation to avail the competitive advantage; competitors must not be easily imitable. Additionally, innovation requires a robust financial system for a considerable investment volume to bring change in process, technology, marketing, and education to customers (Lodh et al., 2014). Xie, Huo, and Zou (2019) used 209 firms listed in China in manufacturing sectors and found that process innovation and product innovation positively and statistically significant association with FP.

CG can guarantee effectual planning and control of risk associated with R&D innovation. CG ownership and the board of directors are vital for these strategic decisions. The firm's shareholders are more endeavours to stabilize FP and investment in R&D innovation in the long-term perspective (Lodh, Nandy and Chen, 2014; Lee and O'Neill, 2003). Shareholders of a firm are the source of power to oppose or support the management decisions determined by the concentration of ownership (Lee & O'Neill, 2003). Influence of OS on management decisions about investment in R&D, FP studies in the context of agency theory.

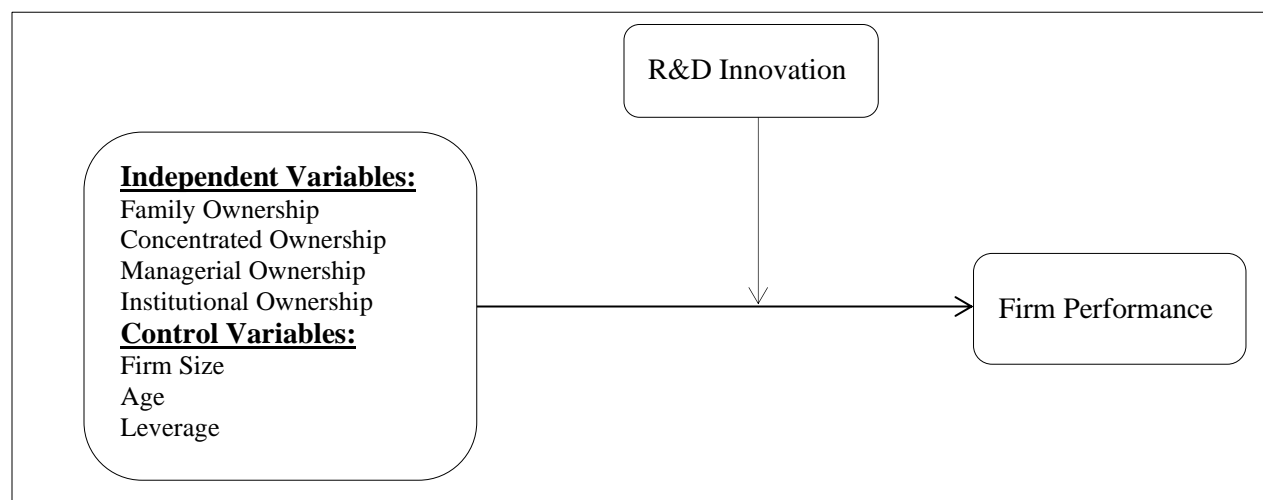
Family and concentrated ownership control the firms in emerging countries; either the firm is small or large. Family and concentrated ownership significantly affect R&D innovation for competitive advantage and economies of scale (Lee & O'Neill, 2003). They also motivate their management towards loyalty,

stability, altruism and commitment, and organizational culture by which management focuses on long-term investment (H. L. Chen & Hsu, 2009). While contrary to this, family ownership being highly risk-averse shows negative relation with R&D Innovation (J. Diéguez-Soto *et al.*, 2019, Bano *et al.*, (2018); Chen and Hsu, 2009). An empirical study conducted in India reports R&D and family ownership are positively associated claimed that R&D and family ownership eradicate the agency cost from their business. Contrary to this, an Investigation based on Canadian firm data in the context of agency theory to pursue long-term benefits found that family ownership has a negative relation with R&D (Di Vito *et al.*, 2010). While the Investigation in Taiwan on the data of electronic firms for the period 2002-2007 found that family ownership has no significant relation with R&D (H. L. Chen & Hsu, 2009).

Recently, management focused on investment in an environment without reducing FP. In this connection, R&D Play a vital role in reducing the environmental impact on business performance. Resource-based theory (RBV) postulates that a firm could achieve a competitive advantage by allocating resources to business-friendly environment activities (Alam *et al.*, 2019). R&D innovation facilitates the firm to perceive customers' demand, the orientation of the market and society, produce the new product, and change the production process in terms of technology and efficient use of available resources (Alam *et al.*, 2019). Bobillo, Rodríguez-Sanz, and Tejerina-Gaite (2018) investigate on 1942 firm's data for 1999-2014 from Germany, France, Italy, United Kingdom, United States and Spain to explore the relationship between CG variables institutional ownership and managerial incentives on R&D innovation. They discovered a nexus between institutional ownership and R&D innovation. They argue that institutional investors reduce managerial opportunism and incentivize managers for innovation. Their findings and arguments support those R&D innovation-led investors for long-term financial benefits and leads to managers for the higher incentive that enhances the FP. López Iturriaga and López-Millán (2017) researched by using 956 firm data from 19 developed countries for 2003-2007 to explore legal protection to investor, institutional investors effect on R&D innovation, who discovered that institutional investors have a positive association with R&D. Concentrated ownership protects investor rights and has a favourable influence on R&D innovation in sectors where legal protection for investors is inadequate. Empirically, Chatterjee and Bhattacharjee (2020) concluded that R&D innovation signals investors about long-term intensive technology of production and market orientation, which boosts investor confidence and their active participation in management decisions to boost the market value of the firm and performance. Based the literature view and existing empirical emphasized that:

**Ha5:** R&D innovation moderates the relationship between firm performance and ownership groups.

Figure 1: *Conceptual Research Framework*



## Research Methodology

### Population and Samples

From 2011 to 2020, we established the selection of companies listed on the Pakistan Stock Exchange (PSX). Initially, the total sample consisted of 518 firms. We exclude the sample of 97 financial sector firms because they use different accounting rules, and their investing strategies vary, and there are 125 firms missing data samples. Finally, 296 firms were retained for analysis of the study. We follow panel data techniques for regression analysis. The data was collected by using financial reports of firms.

### Variables Measurement

Table 1 provides the variable definition used in the study.

Table 1: *Variable Measurement*

Variables	Measurement	Reference
<b>R&amp;D Innovation</b>	R&D expenses divided by total assets	(Liu, Lei, and Buttner, 2020)
<b>Family Ownership</b>	20% or more shares held by family members or directors are assigned 1 otherwise 0.	
<b>Managerial Ownership</b>	Number of shares held with directors and executives of firm dividend by the total number of shares	(Cheng, Su, and Zhu , 2012)
<b>Institutional Ownership</b>	The proportion of shares held with institutions scaled to total numbers of shares	(Dam and Scholtens, 2012)
<b>Concentrated Ownership</b>	The top five shareholdings are used as a proxy	(Bano et al., 2018)
<b>Firm Performance</b>	Return on total assets (ROA) computed by dividing net profit by total assets. Return on equity (ROE) computed by dividing net income to total owners' equity, and Tobin's Q (Firm's total market value divided by its total asset value)	(Bano et al., 2018; Zhang et al., 2014)
<b>Firm Size</b>	Natural log of total assets	(Liu, Lei, and Buttner, 2020)
<b>Leverage</b>	Total debt divided by total assets	(Liu, Lei, and Buttner, 2020)
<b>Firm Age</b>	Years since the company was first registered with the Securities Exchange Commission of Pakistan (SECP)	(Cordeiro et al., 2018)

### Analysis Model and Estimated Methods

We followed Tang et al. (2018) in examining the effect of OS on FP.

$$FP_{I,T} = \alpha + \beta_1 Mang\_Own_{I,T} + \beta_2 Inst\_Own_{I,T} + \beta_3 Con\_Own_{I,T} + \beta_4 Family\_Own_{I,T} + \beta_5 Age_{I,T} + \beta_6 Leverage_{I,T} + \beta_7 Firm\ Size_{I,T} + \epsilon_{I,T} \quad (1)$$

Where FP is financial performance measured by ROA, ROE and Tobin's Q. Mang-own is managerial ownership, inst-own is institutional ownership, con-own is concentrated ownership, family-own is family ownership, age is firm age in years, leverage is for debt burden of a firm, firm size is size of firm with respect to assets. By following the Lin et al. (2021) given equation is used for R&D moderating effect.

$$\begin{aligned}
FP_{I,T} = & \alpha + \beta_1 Mang\_Own_{I,T} + \beta_2 Inst\_Own_{I,T} + \beta_3 Con\_Own_{I,T} + \beta_4 Family\_Own_{I,T} \\
& + \beta_5 Age_{I,T} + \beta_6 Leverage_{I,T} + \beta_7 Firm\ Size_{I,T} + \beta_8 Mang\_Own_{I,T} * RD \\
& + \beta_9 Inst\_Own_{I,T} * RD + \beta_{10} Con\_Own_{I,T} * RD + \beta_{11} Family\_Own_{I,T} * RD \\
& + \beta_{12} RD_{I,T} + \varepsilon_{I,T}
\end{aligned}
\tag{2}$$

### Analysis Strategy

The statistics shown in Table-2 are descriptive statistics

Table 2: Descriptive Statistics

	Mean	Median	Max.	Min.	Std. Dev.	N
ROA	8.927	7.535	217.309	-71.236	15.013	2960
ROE	9.464	8.846	270.157	-226.463	33.797	2960
Tobin's Q	1.679	1.213	25.591	-4.507	1.658	2960
Con_Own	66.102	68.750	99.853	0.000	20.908	2960
Fam_Own <sup>1</sup>	0.524	1.000	0.000	0.000	0.500	2960
Inst_Own	15.135	8.367	98.787	0.000	19.351	2960
Mang_Own	28.701	20.637	98.852	0.000	29.274	2960
Age	38.311	35.000	108.000	5.000	16.011	2960
Firm Size	15.358	15.309	20.574	8.785	1.685	2960
Leverage	0.630	0.572	6.894	0.000	0.479	2960
R&D	0.008	0.000	2.232	-36.798	0.689	2960

Note: Table 2 indicates the mean, standard deviation, maximum, and minimum. The analysis was performed on 296 firms' data from 2011 to 2020, containing 2960 observations.

Table 3: Correlation Analysis

	1	2	3	4	5	6	7	8	9	10	11
ROA	1.000										
ROE	0.537***	1.000									
TQ	0.425***	0.306***	1.000								
COWN	0.079***	0.091***	0.111***	1.000							
FOWN	-0.134***	-0.120***	-0.228***	-0.179***	1.000						
IOWN	0.043**	0.017	-0.065***	-0.025	-0.192***	1.000					
MOWN	-0.110***	-0.107***	-0.215***	0.081***	0.773***	-0.220***	1.000				
AGE	-0.016	-0.013	0.065***	0.122***	-0.080***	0.044**	-0.117***	1.000			
FSIZE	0.173***	0.143***	0.171***	0.099***	-0.335***	0.076***	-0.267***	0.08***4	1.000		
LEVA	-0.209***	-0.009	0.068***	-0.020	-0.066***	0.013	-0.057***	-0.068***	-0.023	1.000	
RD	-0.034*	-0.018	-0.015	-0.009	-0.005	0.030	-0.011	-0.002	-0.002	0.020	1.000

Note: Table 3 performed the correlation analysis by using 296 non-financial firms' data listed on the Pakistan stock exchange for the period 2011- 2020, and in total, 2960 observations are used. Correlation analysis reports the strength, direction and significance of all study variables. \*10%, \*\*5%, \*\*\*1% show significance level.

<sup>1</sup> Dummy variable, 20% or more shares held by family members or directors are assigned 1 otherwise 0.

Values of correlation lie between -1 and +1; the numeric number shows the strength of relationships, the  $\pm$  sign indicates the direction of the relation + sign shows a positive connection, and the –sign shows a negative association of variables (Mughal et al., 2020).

By following the Anser, Zhang and Kanwal (2018) test normality with the Shapiro-Wilk test and found Prob>Z 0.000 of all variables. Wooldridge test for autocorrelation. The test results are F (1, 59) =19.862 and Prob.>F=0.000; therefore, the null hypothesis does not prevail. Breusch-Pagan / Cook-Weisberg test was performed for heteroscedasticity to reject the null hypothesis i-e zero variance across the entities. The result indicates chi2 (1) =71.51 and Prob>chi2=0.000, which shows that heteroscedasticity exists in data. To determine multicollinearity across independent variable, the Variance inflation factor analysis (VIF) was performed. VIF analysis result reveals that values are between 2.38 to 1.09, and the mean VIF is 1.56, which means that multicollinearity is absent in the data. CSD, Pesaran's test is applied, and results show cross-sectional independence = 10.145, Pr = 0.00. The test result indicates that cross-section independence does not exist in current data. Based on findings this study used a EGLS model.

Table 4: *Regression analysis of ownership structure impact on firm performance*

Variable	MODEL 1 ROA	MODEL 2 ROE	MODEL 3 TOBIN'S Q
Constant	-5.434 (-0.904)	-25.727*** (-3.612)	3.776*** (2.754)
Con_Own	0.149*** (4.613)	0.238*** (10.017)	-0.001*** (-2.994)
Fam_Own	5.190*** (3.575)	4.235*** (2.797)	-0.152*** (-4.742)
Inst_Own	0.161*** (2.298)	0.232*** (4.436)	-0.0004 (-0.239)
Mang_Own	-0.149*** (-3.187)	-0.144*** (-3.672)	0.001*** (6.001)
Age	-0.103*** (-2.588)	-0.123*** (-2.937)	-0.004 (-1.605)
Firm Size	0.670 (1.540)	1.495*** (3.709)	-0.111*** (-6.378)
Leverage	-7.423*** (-6.955)	-2.544*** (-6.758)	0.592*** (5.667)
AR(1)	0.680***	0.556***	0.893***
Industry Fixed Effect	Yes	yes	Yes
R-squared	0.564	0.500	0.795
F-statistic	621.350***	406.470***	300.253***
Observation	2664	2664	2664

Table 4 Regression analyses performed with Panel Two-Stage EGLS on 296 non-financial firm data from 2011 to 2020 with 2664 observations. Further, the regression includes the autoregressive term AR (1) to control autocorrelation. EGLS regression is performed by selecting Cross-section by weight and the White cross-section coefficient covariance method to control heteroscedasticity. \*10%, \*\*5%, \*\*\*1% significance level.



Table 5: *Moderating role of R&D between ownership structure and firm performance*

Variable	MODEL 4 ROA	MODEL 5 ROE	MODEL 6 Tobin's Q
Constant	-0.476 (-0.370)	-6.900*** (-2.907)	0.213*** (8.487)
Con_Own	0.023*** (3.379)	0.037*** (5.217)	-0.001 (-0.494)
Fam_Own	0.399 (1.205)	-1.418*** (-3.846)	-0.045*** (-4.093)
Inst_Own	0.007 (1.230)	0.043*** (5.601)	0.001 (0.893)
Mang_Own	-0.028*** (-4.528)	-0.035*** (-4.398)	0.003 (1.470)
AGE	-0.032*** (-5.264)	-0.036*** (-3.758)	-0.003 (-1.505)
Firm Size	0.183** (2.3569)	0.532*** (4.186)	-0.243*** (-20.652)
Leverage	-1.141*** (-2.686)	0.270 (1.273)	0.517*** (4.292)
Con_Own*R&D	<b>0.059***</b> (2.958)	0.177** (2.005)	0.002 (1.334)
Fam_Own*R&D	-5.575 (-0.643)	14.731*** (3.013)	0.214 (1.113)
Inst_Own*R&D	<b>0.094**</b> (2.232)	0.063 (0.656)	0.003 (0.292)
Mang_Own*R&D	<b>0.777*</b> (1.799)	0.909 (1.492)	0.09** (2.172)
R&D	-15.923** (-2.816)	-14.902** (-2.065)	-0.226* (-1.887)
AR(1)	-0.072*	-0.136***	0.010
Industry Fixed Effect	YES	YES	YES
R-squared	0.705	0.600	0.780
F-statistic	420.616***	295.4***	595.064***
Observation	2664	2664	2664

Table 5: Regression analyses were done using Panel EGLS over 296 non-financial enterprises' data from 2011 to 2020 with 2664 observations to explore the moderating influence of R&D between OS and FP. We used the autoregressive term AR (1) and lagged dependents ROA, ROE and Tobin's Q to control autocorrelation. Cross-section weight and White cross-section coefficient covariance method used to control heteroscedasticity. \*10%, \*\*5%, \*\*\*1% significance level.

## Results and Discussion

**Ha1-4** Table 4, Model 1,2 and 3 report results for predicting FP accounting measure ROA and ROE and market performance measure Tobin's Q. Results confirm that family ownership, concentrated ownership and institutional ownership have a significant positive association with ROA and ROE. This finding supports the study hypotheses Ha1, Ha2, but except Ha3. The results are complemented by previous

findings by (Bano *et al.* 2018; Chatterjee and Bhattacharjee, 2020; Singal and Singal, 2011; Manzaneque, 2019). They argued that family and concentrated ownership bring better governance and control over management. Concentrated and family ownership mitigate agency conflict between shareholders and managers. They have an orientation to entrepreneurship and led to a firm outer performance. Aside from that, both have longer investment objectives, which results in effective investment efficiency.

Contrary to the above, family ownership and concentrated ownership have a significant negative relation with Tobin's Q's market performance measure. The results complement Javed and Iqbal (2007), who found that family-owned firms negatively associate a firm market value in Pakistan. Who claims that concentrated shareholdings and board independence have nothing to do with good performance? The premise of agency theory does not apply where alignment of ownership and control is tight and outside directors are required. Institutional ownership does not show any significant association with a firm's market performance evaluated by Tobin's Q. This outcome is consistent with the findings of Bano *et al.* (2018). This means that board nominations are often bureaucrats or army personnel with little or no experience in corporate concerns. Second, they lack strong incentives for effective monitoring because the performance of the enterprises in which they have an investment portfolio has little bearing on their careers. Concentrated ownership positively association with FP is incompatible with the conclusions of Alkurdi et al. (2021), who conduct research in Jordan by using listed firm data 2012 to 2018.

Results report that managerial ownership positively correlates with the company's market value as evaluated by Tobin's Q. Result supports the study hypothesis Ha4. Findings are consistent with Bano *et al.* (2018) argument that managers have a strong incentive to manage matters effectively and generate wealth to the firm's wellbeing where their fortunes are ties. The findings show that managerial ownership has a significant negative relationship with ROA and ROE, and that higher levels of insider ownership have negative consequences such as complacency, entrenchment, and appropriative behaviour. Study findings results for managerial ownership and FP are in contrast to Alkurdi et al. (2021) who find its negative relation with performance in using Jordan listing firms data. In weak legal protection to investors, systems favour concentrated ownership mechanisms for effective control and promoted FP (Singal & Singal, 2011).

**Ha5:** R&D innovation interaction with ownership structure on firm performance. Results in table-5 models 4, 5 and 6 indicate that R&D innovation interaction term with concentrated ownership, institutional ownership and managerial ownership on ROA has a significant positive association. R&D innovation interaction term with concentrated ownership and family ownership positively relates to ROE results agree with Chatterjee and Bhattacharjee (2020). They support that both intensities in ownership and R&D enhance its market share. Furthermore, the R&D interaction term with management ownership has a significant positive effect on the firm's market value (Tobin's Q).

These findings support the study hypothesis. Findings are consistent with (Chatterjee and Bhattacharjee, 2020; J. Diéguez-Soto *et al.*, 2019; and Canh *et al.*, 2019); concluded that R&D innovation signals to the market about ongoing technology-intensive projects, which led to building investor confidence, in turn, enhance the market value and performance of the firm. Furthermore, the study findings for R&D innovation interaction with managerial ownership on FP do not agree with J. Diéguez-Soto *et al.* (2019), who found that R&D innovation negatively moderates the family ownership impact on FP. While R&D as an independent variable negatively influences FP, results are consistent with (Chatterjee and Bhattacharjee, 2020).

## Conclusion

This study bridges a research gap by examining the role of R&D innovation in moderating the relationship between OS and FP. Study findings reveal that the firm's different OS has various impacts on the FP of firms. The empirical findings show that family ownership, concentrated ownership, and institutional ownership significantly affect FP (ROA and ROE). Family ownership negatively correlates with market value (Tobin's Q). Managerial ownership, on the other hand, has a negative relationship with

ROA and ROE and a good relationship with Tobin's Q. The findings of the investigation reveal that in Pakistan, corporations have a higher concentration of ownership in the hands of family and block holders, which is the result of a weak CG. More important than ownership concentration is the nature of the ownership. The findings show that specific factors in the organisation have an impact on the OS. The results show that increasing R&D intensity offers a more significant opportunity for improving the FP of businesses. R&D innovation builds investors' confidence as a resource-based view (RBV) approach for achieving high FP and enhancing the firm's market value. Moreover, this study finds that family, institutional, concentrated and managerial ownership is positively associated with FP when R&D innovation is higher. It implies that R&D innovation signals to investors for ongoing technology projects for sustainable growth. It builds investors' confidence and leads to ties to enhance the FP.

### **Implications and Limitation**

The study findings contain functional implications for policymakers and firms need to carefully administer the stock base incentives to the executive of the firm if they are promoting R&D innovation. Besides, policymakers and firms need to develop an R&D innovation mechanism for equity holders to enhance the accounting and the firm's market performance. The researchers should acknowledge that the study sample is only from Pakistani listed firms. Its generalization needs caution. There is a crucial need to explore more factors that can moderate the shareholder's relationship with FP. The moderating factor could be institutional cross-sectional cultural differences between industries and countries. It might be possible that the same study in other countries will produce different results.

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### **ORCID iDs**

Muhammad Siddique<sup>1</sup>  <https://orcid.org/0000-0001-8326-9379>

Abdul Rasheed<sup>2</sup>  <https://orcid.org/0000-0001-9268-5446>

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